

PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Steel Sheet or Strip

We, ADAM OPEL AKTIENGESELLSCHAFT, a German Company of Rüsselsheim am Main, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to steel sheet or strip.

10 Sheets or strip of soft or alloyed steels are used in industry for shaping operations of the most diverse kinds, for example in vehicle body construction. The surface of the sheets may be improved, either by being coated with enamel, e.g. sprayed, or subjected to an electrolytic treatment.

Surface roughness has a great influence on the workability of the sheets during their shaping by non-cutting methods. Depending on the kind of deformation, the sheet should have a certain roughness in order to ensure that a favourable transfer impression is obtained between the tool and the sheet surface during deep drawing. The advantages obtained by this are avoidance of scrap caused by tearing of the sheet, avoidance of fold formation and surface defects, and saving of grease required for the drawing operation.

30 The surface roughness which is of advantage for deep drawing cannot be adopted however in many cases. This applies in all those cases where a surface refinement is to be subsequently carried out. It has therefore been necessary to choose a surface roughness which amounts to an economic or qualitative compromise between the conflicting requirements.

40 By the present invention, steel sheet or strip may be made which is more adapted to both these requirements.

The invention consists in steel sheet or strip of which the opposite sides have a different degree of roughness each within the

range of roughness $R_a=0.5$ to 3 microns, the difference between the roughness grades of the two sides amounting to 0.3 microns at least.

Preferably the roughness grade of one side of the sheet which is intended for entering into contact with shaping tools, amounts to $R_a=2.1 \pm 0.4$ microns, and the roughness grade of the other side of the sheet which is to be surface-improved, amounts to $R_a=1.2 \pm 0.3$ microns. By roughness grades are meant those quoted as a mean roughness value in German Engineering Standard Specification DIN 4762.

During the rolling operation, the sheet should be worked with rolls having different surface roughnesses. Thus the rolling mill train last traversed by the sheet, may operate with rolls of which the upper one has for example a roughness of $R_a=1.2 \pm 0.3$ microns, whilst the lower roll has a roughness of $R_a=2.1 \pm 0.4$ microns.

WHAT WE CLAIM IS:—

1. Steel sheet or strip of which the opposite sides have a different degree of roughness each within the range of roughness $R_a=0.5$ to 3 microns, the difference between the roughness grades of the two amounting to 0.3 microns at least.

2. Steel sheet or strip in accordance with claim 1, of which the roughness grade of one side of the sheet amounts to $R_a=2.1 \pm 0.4$ microns, and the roughness grade of the other side of the sheet amounts to $R_a=1.2 \pm 0.3$ microns.

3. Method of making sheet metal or strip in accordance with either of the preceding claims, in which during a rolling operation, the sheet is worked with rolls whose surface roughnesses are different.

4. Method according to claim 3, in which the working of the sheet or strip with the

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rolls of different surface roughness is the last rolling operation of a series.

5. Steel sheet or strip, substantially as hereinbefore particularly described.

- 5 6. A method of making a motor vehicle body part by deep drawing steel sheet, in which the side of the sheet which comes into contact with the shaping tool has a roughness grade of $Ra=2.1 \pm 0.4$ microns, and the other

side, which is afterwards improved, has a roughness grade of $Ra=1.2 \pm 0.3$ microns. 10

7. Motor vehicle body parts made from steel sheet or strip according to any of claims 1, 2 or 5, or made by the method according to claim 6. 20

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